



## Quantifying the Economic Impact of Communication Inefficiencies in US Hospitals

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**Editor's Note:** This research briefing provides an updated estimate for the model released in Research Briefing Volume 3, Issue 1A. The revised cost of communication inefficiency effect on length-of-stay reflects an expense base only, rather than a charges base. Hence, this estimate is more conservative. It is important to note that the direct & indirect costs of patient safety, staff satisfaction and patient experience, while included in the conceptual model, are not included in the quantitative estimate in any release to date.

The US healthcare system has frequently been criticized for a number of shortcomings, including excessively high costs and poor quality of care. The practice of medicine is a complex undertaking involving multiple interactions among multiple stakeholders that are distributed in time and space, and effective communication between these dispersed parties is critical to ensuring quality and safety in care delivery, while simultaneously improving operational efficiencies. Time and motion studies in hospital and ambulatory settings provide strong evidence that care providers – doctors and nurses – spend a significant proportion of their time in obtaining or providing information, i.e., communication. Yet, surprisingly, there are no studies reported in the literature that attempt to quantify the economic waste associated with lapses in communication in hospital settings at a national level.

We conducted a multi-stage study to develop models for quantifying the economic burden of poor communications in hospitals in the US. Hospitals occupy a central role in the US healthcare system; they employ over 5 million full-time and part-time workers, and hospital jobs pay significantly more on average than jobs in other

*...communication extends all the way from the intimate interaction between a clinician and a patient to the most public dissemination of information (Harvey Fineberg, President, Institute of Medicine)*

service industries. In 2006, hospitals accounted for 31% of overall healthcare expenditures estimated at \$2.1 trillion (16% of US GDP.) In Stage 1 of the study we reviewed prior literature focused on communication within hospital settings. This review surfaced several outcomes of poor communications, and a limited number of quantitative estimates of these outcomes. We followed this in Stage II with interviews conducted with key informants in seven hospitals, including senior administrators and clinical staff. This primary data provides additional insights related to the opinions of stakeholders about the challenge of poor communications. We combined the data collected in Stage I and Stage II to construct a conceptual model of the outcomes of poor communications. Finally, in Stage III we developed a quantitative model for estimating inefficiency. To quantify the proportion of communication that could be classified as waste, we used estimates available in published sources from time and motion studies in clinical settings, and the primary data gathered from interviews.

### Work Processes and Communication in Healthcare Delivery

Wasted time in healthcare is closely linked to research on hospital efficiency, a topic on which some time and motion studies have been conducted. The underlying complexity of healthcare related processes and procedures, coupled with the significant variety in types of patients treated and practice settings greatly limits the scope of these studies. They do, however, provide valuable qualitative insight and important quantitative proxies for the time stakeholders employ in adding value in health care, highlighting important improvement opportunities for the overall system.

Overall there is agreement in the literature that the practice and delivery of healthcare is fundamentally and critically dependent on effective and efficient communication. The complexity of inpatient care delivery is exemplified by the discharge planning process, which demands rapid and timely access to information, the ability to involve important stakeholders at any point in time, and platforms for coordinating the work of care providers and other actors who may be physically and temporally distributed. All concerned parties need to be able to view the same set of information related to the

status of a patient, and have the capability to communicate either asynchronously or synchronously as situation and availability demand. Communications technologies, coupled with process redesign, have a major role to play in enabling these capabilities. However, the evidence on the specific value created by such systems for a hospital and for the patients it serves is sparse.

### The Qualitative Study

We conducted a qualitative study of communication challenges in seven hospitals. Data were collected through structured interviews with key informants. Questions encompassed four broad domains: (1) the identification of specific bottlenecks in current communication processes during care delivery and discharge planning, (2) an understanding of the negative outcomes that result from these bottlenecks, (3) respondents' subjective quantification of the extent to which the negative outcomes could be mitigated by improving communications, and (4) respondents' opinions on specific communication capabilities that they might find useful, such as collaborative workspaces, mobile telephony, etc.

When asked whether communications in the hospital were a challenge, every interviewee responded strongly in the affirmative. They each provided several examples of poor communications in their respective settings. The Chief Nursing Officer at Hospital F said "I think there's a tremendous amount of wasted time and effort in tracking down people. It's huge!" She went on to observe that one of the nurses took four years to find out how to discover which doctor is on call. The CIO at hospital G said "In an environment like ours, where there may be many different physicians and nurses who are participating in a care team for a patient, it is difficult to always know who is in charge [...]. It sounds like it wouldn't be a big deal, but it's amazingly complicated and very difficult to ensure that you always reach the right person at the right time." She also noted "most of the time when an error is made it's because somebody changed something and forgot to communicate that to the rest of the care team." In general, consistent with what has been seen in prior research, the overwhelming sentiment of the respondents was that communication lapses occurred frequently in the hospital and they resulted in inefficiencies in the utilization of clinical staff, as well as increased the likelihood of mistakes. Further, the respondents pointed out that poor coordination result in patients not being serviced in a timely manner, thereby increasing patient risk and possibly length of stay.

The picture that emerged from these interviews is that the hospital environment is rife with communication delays and failures. In some ways this is not surprising, given the

number of caregivers that have to closely coordinate their activities in the process of delivering care, the distributed location of resources, and the high-pressure and frequently resource constrained hospital setting where doctors and nurses are simultaneously attending to a large number of patients. Not only does this result in a suboptimal use of scarce resources such as the expertise and skill of the caregivers who may find themselves performing non-value adding activities such as tracking people down, or of hospital beds that remain occupied because patients are not discharged on time due to poor coordination during the discharge process, it can also have serious ramifications for patient safety and quality of care. The qualitative data validated the need to begin to understand the extent to which poor communication is influencing the effectiveness and efficiency of hospitals.

### A Conceptual Model of Communication Outcomes

Based on the data collected through the interviews and a review of prior research, we developed a conceptual model of the various outcomes associated with the quality of communication in a hospital.

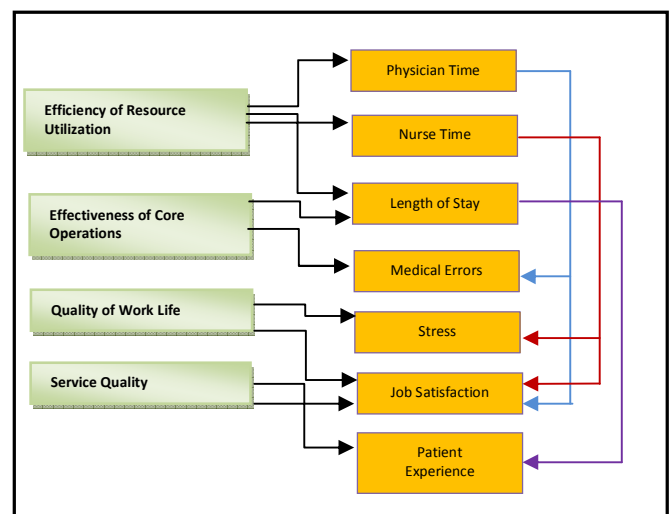


FIGURE 1. Communication Outcomes in a Hospital

We isolated four primary dimensions along which communication quality can be assessed: efficiency of resource utilization, effectiveness of resource utilization, quality of work life, and service quality, and associated specific outcome metrics for assessing each dimension.

Efficiency of resource utilization reflects the optimal use of the key and often scarce resources in hospitals: the time of physicians and nurses. Appropriate diagnoses and rapid and safe patient treatment represent the effectiveness of the core operations of the hospital, and are measured by length of stay and the incidence of medical errors. Several studies have highlighted the importance of

communications quality for improving working conditions in hospitals for clinicians. Therefore we include quality of work life as a third dimension, measured by job-related stress and job satisfaction. Finally, it is important to recognize that healthcare is fundamentally a service business and hospitals are service organizations.

The notion of service quality is a key component of quality improvement efforts that seek to meet or exceed customer expectations through process improvement. There are multiple ways in which poor communications can affect service quality; e.g., a patient not being informed about test results in a timely manner, delays in patient discharge, and a lack of information availability for the patient's family. Poor service quality affects both care givers and patients, as reflected in the metrics of job satisfaction and patient experience.

The conceptual model explicitly captures the interconnectedness among the various communication outcomes. An unproductive use of their professional expertise is likely to affect the job satisfaction of professional care givers. Likewise, any increase in length of stay will negatively affect the patient experience in the hospital. The literature acknowledges that nurses are the primary care givers in hospitals, and excessive workloads on nurses, caused in part by an inefficient use of available time, can result in compromised patient safety. Overall, the model demonstrates that the negative consequences of communication inefficiencies are manifold and multi-dimensional. The fact that the consequences are tightly linked suggests that poor communications pose the risk of a "vicious" cycle for hospitals: wasted nurse and physician time and increased length of stay reduce hospital margins, staff and patient satisfaction, further limiting the ability of the hospital to generate economic resources for long-term sustainability.

Some of these dimensions such as efficiency and effectiveness of resources utilization and their associated metrics are tangible and can be directly translated into monetary terms. Others affect economic value through a complex causal chain. For example, poor service quality can lead to staff turnover, thereby increasing the costs of recruiting and training of nurses for the hospital. Poor service quality also affects the patient experience, and negative experiences can result in patients selecting alternative hospitals and/or adversely affecting the reputation of the hospital through word-of-mouth communications. Thus, it is important for hospital executives to monitor not only the easily measurable tangible outcomes, but also the more difficult to quantify

intangible consequences that may have even more negative down-stream economic ramifications.

### An Economic Model for the Efficiency of Core Operations

The model predicts overall waste in US hospitals that can be attributed to poor communications and is constructed from data gathered through the interviews, the review of prior work, and other published secondary data sources. Following from the conceptual model, the economic model quantifies three categories of waste: physician time, nurse time, and patient length of stay. The overall model logic is as follows: for doctors and nurses, it is predicated on estimating the proportion of time spent on communication that is "wasted"; while for LOS, we estimated the increase attributable to poor coordination during care and discharge coordination.

According to our estimation, US hospitals "waste" approximately \$12b annually due to poor communication among care providers. The loss, as percentage of hospital revenues is 1.93% -- when juxtaposed against the average hospital margin of 3.6% (AHA), the magnitude of the waste is particularly striking.

It is also worth noting that the loss due to increase in length of stay dominates the overall economic burden, accounting for approximately 54% of the total waste (see Figure 2). Thus, any action that hospitals can take to streamline the processes related to care coordination and discharge planning, especially those that involve communication, are likely to have a significant bottom line impact.

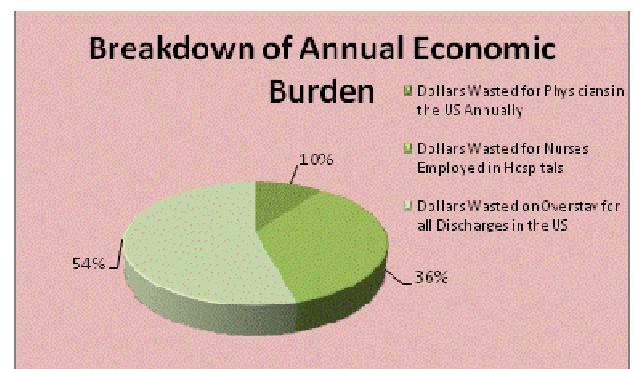


FIGURE 2. Annual Economic Burden by Category

### Hospital Level Analysis

The \$12 billion estimate for overall national hospital waste caused by poor communication is not evenly distributed across all hospitals and is influenced by hospital size, annual physician and nurse staffing patterns, and occupancy rates. To further understand what the

estimates of the economic burden at the national level reveal about losses in a specific hospital, we performed a more detailed analysis of wasted nurse time in a hypothetical hospital context. This analysis reveals that a typical 500 bed acute-care hospital will experience an **annual economic burden of about \$4 million** due to wasted physician and nurse communication time and increase in length of stay.

### Conclusion and Implications

Rising costs and medical errors are a cause of significant concern with the healthcare system. Policy makers and healthcare experts continue to lament the fact that despite being one of the most expensive systems in the world, the US healthcare system is far from being high-performance and the quality of care is significantly lower than in nations that spend considerably less. Simply put, inefficiencies and waste are rampant through the healthcare delivery chain.

In order to transform healthcare and guide resource allocation, it is important to isolate the causes of inefficiencies and develop estimates that provide insight into the contribution of different sources of inefficiency to overall waste. Our research focused on one aspect of inefficiency and its economic impact – that caused by poor communication among care providers in hospital settings. To the best of our knowledge this represents the first study to construct a national model of the economic burden of poor communications in hospitals. Our analysis revealed that US hospitals lose over \$12b annually as a result of poor communications. For a typical 500 bed hospital, the annual loss is in excess of \$4m.

Our economic modeling is based on a set of assumptions and some data from secondary sources. We believe it represents a conservative estimate of the waste. As shown in the conceptual model, there are several additional contributors to the economic burden of poor communications such as patient safety, patient and staff satisfaction, etc. that we have not assessed. Even with the limiting assumptions, the annual loss figure is substantial and very clearly points to the need for interventions and policies to address the root causes of inefficiencies. Hospital administrators and key decision makers must make the identification of communication bottlenecks and breakdowns a key priority in their hospital transformation agenda. Many have argued that in addition to modifying communication process protocols through policies and standards, a greater and more effective infusion of communication technologies into the hospital context can address communication challenges. Given the substantial economic value that can be realized from improved

communications, US hospitals need to accelerate the adoption and implementation of such technologies. The natural question that arises is “how much is it going to cost to fix this?” Future work will focus on developing detailed cost benefit analyses for different interventions using data from our baseline model.

One crucial issue with respect to improving communications in hospitals is related to ownership of communication processes. At the current time we believe that responsibility for ensuring the efficiency and effectiveness of communication activities is not sufficiently demarcated and assigned. To the extent that improving the quality of communications requires both technological solutions and a detailed clinical process understanding, a multi-disciplinary team that includes the hospital Chief Information Office, the Chief Medical Information Officer, the Chief Nursing Office, and the Chief Medical Officer would be able to provide the type of multi-faceted understanding of hospital operations and the senior leadership and vision necessary to implement change.

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